

Amendments according to Art. 34. PCT

Use of omega-3-fatty acid-containing oils for increasing the bioavailability of secondary plant ingredients from plant extracts

The present invention relates to the use of omega-3-fatty acid-containing oils for
5 increasing the bioavailability of secondary plant ingredients from plant extracts.

The term „secondary plant ingredients” comprises those ingredients of the plant,
which are of no relevance as energy sources or structural substances. They serve
the plant for example as colorants, defensive agents or attractants. The number of
10 secondary plant ingredients is estimated to be from 10,000 to 30,000 individual
substances. With respect to their chemical structure or their biogenesis they can
be classified into the following groups:

Polyphenols: This group comprises simple phenol carboxylic acids such as gentis-
15 inic acid, protocatechuic acid, gallic acid or caffeic acid as well as flavones such as
kaempferol, quercetin, myricetin, isorhamnetin, naringenin, 6-prenylnaringenin, 8-
prenylnaringenin, isoxanthohumol and their glycosides, chalcones such as xan-
thohumol, isoflavones such as daidzein and genistein, anthocyanins such as pelar-
gonidin, cyanidin, malvidin or delphinidin, tanning agents such as catechin and
20 epicatechin as well as oligomers and polymers thereof.

Isoprenoids: This group comprises all compounds derived from isoprene such as
monoterpenes such as thymol, menthol or carvone, diterpenes, triterpenes such
as phytosterols (β -sitosterol, campesterol, stigmasterol), cardenolides, tetrater-
25 penes such as carotenes.

Since the bioavailability is a prerequisite for a physiological or pharmacological effect, an increase in the bioavailability of the secondary plant ingredients is desirable and is the object underlying the present invention.

- 5 This object underlying the present invention is solved by the use according to claim 1 and by the method according to claim 9.

It is known that apolar compounds such as carotene or lycopene are resorbed in a better way in case of a high-fat meal compared to a low-fat meal. It has now surprisingly been found that also polar compounds such as flavones are resorbed in a
 10 better way upon simultaneous administration of fat. Particularly, the use of omega-3 fatty acids has turned out to be advantageous. Furthermore, it was unexpectedly observed that sensitive plant ingredients are stabilized in a mixture with said oils, i.e., their degradation does not occur or occurs at a decreased rate.

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Suitable oils having a content of omega-3-fatty acids are, for example, fish oil, linseed oil or perilla seed oil.

Compositions containing one of the following combinations are preferred: extract
 20 from *Opuntia ficus-indica* and perilla seed oil, extract from *Vitis vinifera* and perilla seed oil, extract from *Humulus lupulus* and linseed oil, extract from *Ginkgo biloba* and linseed oil, extract from *Hypericum perforatum* and fish oil, extract from *Camellia sinensis* and fish oil, extract from *Silybum marianum* and perilla seed oil, extract from *Vitex agnus castus* and perilla seed oil, extract from *Vaccinium myrtillus*
 25 *lus* and perilla seed oil, extract from *Trifolium Pratense* and perilla seed oil, extract from

Claims

1. Use of omega-3-fatty acid-containing oils for increasing the bioavailability of
5 secondary plant ingredients from plant extracts.
2. Use according to claim 1, wherein the oil is selected from fish oil, linseed oil
and perilla seed oil.
- 10 3. Use according to claim 1 or 2, wherein the plant extract contains secondary
plant ingredients selected from the group comprising polyphenols, isoprenoids,
glucosinolates and sulfides.
4. Use according to any one of claims 1 to 3, wherein the plant extract contains
15 flavones as secondary plant ingredients.
5. Use according to any one of claims 1 to 4, wherein the plant extract is an ex-
tract from the group of the following plants: Aesculus hippocastanum, Althaea,
Allium cepa, Brassica nigra, Camellia sinensis, Carum carvi, Cimicifuga ra-
20 cemosa, Crataegus oxyacantha, Echinaceae purpurea, Ginkgo biloba, Glycine
max, Hedera helix, Humulus lupulus, Hypericum perforatum, Linum usitatis-
simum, Mentha piperita, Myrtus communis, Opuntia ficus-indica, Panax gin-
seng, Silybum marianum, Trifolium pratense, Vaccinium myrtillus, Vitex agnus-
castus and Vitis vinifera.
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6. Use according to any one of claims 1 to 5, wherein the plant extract and the
omega-3-fatty acid-containing oil are contained in a dietetic food product or in a
pharmaceutical product.

7. Use according to any one of claims 1 to 6 for increasing the bioavailability upon oral administration.

5 8. Use according to claim 7 for increasing the bioavailability upon oral administration in form of a capsule.

9. Method for increasing the bioavailability of secondary plant ingredients from plant extracts, characterized in that they are administered together with omega-3-fatty acid-containing oils.

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10. Method according to claim 9, wherein the oil is selected from fish oil, linseed oil and perilla seed oil.

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11. Method according to claim 9 or 10, wherein the plant extract contains secondary plant ingredients selected from the group comprising polyphenols, isoprenoids, glucosinolates and sulfides.

12. Method according to any one of claims 9 to 11, wherein the plant extract contains flavones as secondary plant ingredients.

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13. Method according to any one of claims 9 to 12, wherein the plant extract is an extract from the group of the following plants: *Aesculus hippocastanum*, *Althaea*, *Allium cepa*, *Brassica nigra*, *Camellia sinensis*, *Carum carvi*, *Cimicifuga racemosa*, *Crataegus oxyacantha*, *Echinaceae purpurea*, *Ginkgo biloba*, *Glycine max*, *Hedera helix*, *Humulus lupulus*, *Hypericum perforatum*, *Linum usitatissimum*, *Mentha piperita*, *Myrtus communis*, *Opuntia ficus-indica*, *Panax ginseng*, *Silybum marianum*, *Trifolium pratense*, *Vaccinium myrtillus*, *Vitex agnus-castus* and *Vitis vinifera*.

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14. Method according to any one of claims 9 to 13, wherein the plant extract and the omega-3-fatty acid-containing oil are contained in a dietetic food product or in a pharmaceutical product.
- 5 15. Method according to any one of claims 9 to 14 for increasing the bioavailability upon oral administration.
16. Method according to any one of claims 9 to 15 for increasing the bioavailability upon oral administration in form of a capsule.

Abstract

The present invention relates to the use of omega-3-fatty acid-containing oils for increasing the bioavailability of secondary plant ingredients from plant extracts.